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2/26/2002

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Application of:

Zhao et al.

Serial No.: 09/317,536

Filed: May 24, 1999

For: Interconnect With Low Dielectric  
Constant Insulators For  
Semiconductor Integrated Circuit  
Manufacturing

Group Art Unit: 2811

Examiner: Douglas W. Owens

Docket No. 50324-1170

*Similar*  
*4-18-2*

**RESPONSE TO FINAL OFFICE ACTION**

Assistant Commissioner for Patents  
Washington, D.C. 20231

Sir:

The Final Office Action mailed October 24, 2001 has been carefully considered. In response thereto, please enter the following amendments and consider the following remarks.

**AUTHORIZATION TO DEBIT ACCOUNT**

It is not believed that extensions of time or fees for net addition of claims are required, beyond those which may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 C.F.R. § 1.136(a), and any fees required therefor (including fees for net addition of claims) are hereby authorized to be charged to deposit account no. 20-0778.

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## AMENDMENTS

Please substitute the following clean copy text for the pending claims of the same number:

Sub FI  
16. (Once Amended) An interconnect comprising:

- (a) one or more metal lines formed from a first metal layer, said metal lines having gaps therebetween;
- (b) low-k material filling the gaps between the metal lines and having a height and one or more vertical portions;
- (c) a protective layer formed over the metal lines and the low-k material, wherein the protective layer covers at least one vertical portion of the low-k material.
- (d) a dielectric layer formed over the protective layer, wherein the dielectric layer has a different composition than the low-k material;
- (e) one or more vias etched in the dielectric layer;
- (f) a metal for filling the vias;
- (g) a second metal layer formed over the dielectric layer; and
- (h) one or more openings in the protective layer for allowing the metal vias to contact the first metal lines.

28. (Twice Amended) An interconnect structure comprising:

- a plurality of metal lines formed on a substrate;
- low-k dielectric structures interposed between two or more of said metal lines;
- a second dielectric material formed above said metal lines, wherein portions of said second dielectric material are formed between portions of said low-k dielectric structures;
- a protective layer interposed between said low-k dielectric structures and said second dielectric material, wherein said protective layer is configured to provide etch selectivity between said protective layer and said second dielectric material; and
- a conductive feature formed within said second dielectric material and said protective layer, said conductive feature in contact with at least one of said plurality of metal lines.

2811

In re PATENT application of: Zhao, et al.

Examiner: Douglas W. Owens

Serial No: 09/317,536

Group No.: 2811

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Docket No.: 050324-1170

Title: INTERCONNECT WITH LOW DIELECTRIC CONSTANT INSULATORS FOR SEMICONDUCTOR INTEGRATED CIRCUIT MANUFACTURING

AMENDMENT TRANSMITTAL LETTER

Assistant Commissioner For Patents  
Washington, D.C. 20231

Transmitted herewith is an amendment in the above-identified application.

☒ Response/Amendment  
☐ Fee as Calculated Below  
☒ No additional fee is required.  
☐ Terminal Disclaimer  
☐ Small Entity Statement has already been filed/is filed herewith

☐ Petition to Extend Time  
☐ Check for \$  
☐ Corrected Drawings  
☐ Other:  
☐ Authorization to Charge Credit Card

The fee has been calculated as shown below.

CLAIMS AS AMENDED FOR LARGE ENTITY					
	Claims After Amendment	Highest Prev. Paid For	Extra	Rate	Additional Fee
Total Claims	19	- 20	0	x 18.00	= \$0
Independent Claims	3	- 3	0	x 84.00	= \$0
RCE					= \$0
Total Additional Fee for this Amendment					= \$0

☐ A check in the amount of \$ is enclosed.  
☐ A Credit Card Payment form is attached in the amount of \_\_\_\_\_.  
☐ The Commissioner is hereby authorized to charge to our Deposit Account No. 20-0778 the amount of \$ for the fee identified above. A duplicate of this Amendment Transmittal Letter is included herewith.  
☒ The Commissioner is authorized to charge any insufficiencies, and the Commissioner is hereby requested to credit any overpayments to our Deposit Account No. 20-0778.

Customer No.: 24504

THOMAS, KAYDEN, HORSTEMEYER  
& RISLEY, L.L.P.

Date: 01-23-02

*Sami Malas*  
Sami O. Malas, Reg. No. 44,893  
Attorney for Applicant(s)



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# CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the U.S. Postal Service as first class mail in an envelope addressed to:

Assistant Commissioner for Patents  
Box: Non-Fee Amendment  
Washington, D.C. 20231

on January 23, 2002.

Mary N. Kilgore  
Mary N. Kilgore

In re **PATENT** application of: Zhao, *et al.*

Serial No: 09/317,536

Filed: May 24, 1999

Title: **INTERCONNECT WITH LOW DIELECTRIC CONSTANT INSULATORS FOR SEMICONDUCTOR INTEGRATED CIRCUIT MANUFACTURING**

Examiner: Douglas W. Owens

Group No.: 2811

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Attached are the following documents for filing with the USPTO:

Postcard  
Amendment Transmittal Form (1 Page)  
Response to Final Office Action

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